local exceptions, excess of rain with high barometer, and deficit with low barometer. His problem is thus reduced to the intensity of the correlation and the chances of a correct forecast of the barometer variation. His next step takes into account temperature changes which may be expected to modify pressure conditions, but his result is disappointing. He obtains rules, but their application is so far a failure that they appear to break down most thoroughly in years of drought—that is, when, if correct, they would be most valuable.

Turning to secular variations, he finds no evidence of progressive change in Batavian rainfall; in fact, the only progressive change on which he lays stress is in Batavian air temperature. Comparison with stations in India, Australia and other places in the same quarter of the globe provides other types of change, but none agreeing with Batavia, and the question is left unsolved.

There remain the short-period pressure waves. The equatorial manifestations of these he attributes to a kind of surge, caused by the great disturbances in higher latitudes, exercising a sucking influence or its converse, with slight variations of the rainfall, less than 10 per cent of the normal, the effect of which is to compensate the pressure difference by cooling or heating air probably above the 3,000-meter level.

Other variations of rainfall, humidity, and cloudiness he considers to be local, and, on the whole, rejects the possibility of forecasting any short-period variations in the rainfall. Inasmuch as we are bound to regard the Tropics as the first stage in the translation of solar variation into weather, it seems a pity that the result obtained in what is probably the best-known region of the Tropics in regard to meteorological statistics should appear so meager and wanting in definiteness.[1] Similar work in temperate regions may well be discouraged. but there is still an enormous mass of data.—*W. W. B.*

PROBABLE AMOUNT OF MONSOON RAINFALL IN 1920.

By GILBERT T. WALKER.

[Reprinted from Nature, London, August 5, 1920, pp. 724-725.]

A memorandum regarding the probable amount of monsoon rainfall in 1920, by Gilbert T. Walker, has recently been issued. Data of importance are given, showing how the monsoon rainfall in India is affected by previous weather conditions over various parts of the earth. In summing up the effects of the various factors it is mentioned that the prejudicial effect of snowfall from Persia to the Himalayas is exerted when at the beginning of June the accumulations extend over a larger area than usual. The great excess of snow reported this year is confirmed by the low temperatures in the Punjab. Heavy rainfall in South Ceylon, Zanzibar, East Africa, and Seychelles is prejudicial, but data for this year show a moderate deficit or normal conditions. A close relationship exists between heavy rain in Java from October to March and low barometric pressure in Bombay in the succeeding six months; in Java the rainfall was nearly normal and its effect is negligible. High barometric pressure in Argentina and Chile is a favorable condition, but this year pressure is in slight defect. It is stated that the conditions indicate in northwest India the monsoon is likely to be weak, at any rate in the earlier part of the season, and for the rainfall of the peninsula, northeast India, and Burma the indications are not sufficiently definite to justify a forecast.

[1] Cf. "Forecasting the weather on short-period solar variations," Monthly Weather Review, Mar., 1920, 48: 149-150, in which C. F. Marvin throws grave doubts on the reality of appreciable short-period solar variations. Therefore, this result does not seem anomalous.—EDITOR.

EFFECT OF THE RELATIVE LENGTH OF DAY AND NIGHT AND OTHER FACTORS OF THE ENVIRONMENT ON GROWTH AND REPRODUCTION IN PLANTS.[1]

By W. W. GARNER and H. A. ALLARD.

[Abstract reprinted from Experiment Station Record, Dept. Agr., Washington, v. 42, no. 9, p. 818.]

The results are given of investigations carried on by the authors in the Bureau of Plant Industry, U. S. Department of Agriculture, in which a dark chamber was used for growing plants, by which the number of hours of exposure to sunlight could be controlled. As a part of the investigation, a series of plantings of soy beans was made in the field at intervals of three days throughout the season, in order that the effects produced by different dates of planting could be compared with those produced by artificial shortening of the daily exposure to light.

Tobacco, soy beans, and a large number of other plants were experimented with, and it was found that the relative length of the day was an important factor in the growth and development of the plants, particularly with respect to sexual reproduction. In some species it was found that the normal plant could attain flowering and fruiting stages only when the length of the day falls within certain limits. Consequently, these stages of development are ordinarily reached only in certain seasons of the year. In the absence of favorable length of day for bringing into expression the reproductive processes in certain species, vegetative development was said to continue more or less indefinitely, thus leading to the phenomenon of gigantism. On the other hand, under the influence of a suitable length of day, precocious flowering and fruiting may be induced. In this way certain varieties or species may act as early or late maturing, depending on the length of day to which they happen to be exposed. The species exposed to a length of day favorable to the growth and sexual reproduction have shown a tendency to assume an ever-blooming or everbearing type of development.

The relationship between annuals, biennials, and perennials was studied, and under artificial conditions it was found possible to change the nature of the plants materially. In all species studied the rate of growth was found directly proportional to the length of the daily exposure to light, but within the limits of the experiment light intensity was not found a factor of importance. With soy beans, limiting water, inducing temporarily wilting daily, was without effect on the date of flowering, although the drought hastened the final maturing of the seed. Interrelationships between length of day and prevailing temperatures of the winter season are said to control successful reproduction largely in many species and their ability to survive in certain regions. The authors point out that the relation between the length of the day and the time of flowering is of great importance in crop yields, and indicates the necessity for seeding at the proper time.

[1] Journ. Agr. Research, U. S. Dept. Agr., Washington, 18 (1920), No. 11, pp. 553-606, pls. 16, figs. 3.